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Maritimes Region

Canadian Science Advisory Secretariat
Science Response 2015/025

ASSESSMENT UPDATE OF GEORGES BANK SCALLOPS *(PLACOPECTEN MAGELLANICUS)*

Context

The purpose of this report is to update the key results from the last assessment with data from 2014 in order to provide science advice for the management of the 2015 fishery. The last full assessment of this stock was in 2013 (DFO 2013, Hubley et al. 2013), and an update was conducted in 2014 (DFO 2014).

The management of the main Scallop fishery on Georges Bank refers to zone 'a'. Georges Bank zone 'b' is a marginal growth area for Scallops and has separate management measures (Appendix 1). The assessment and advice presented in this document use the assessment framework established in 2009 (Jonsen et al. 2009) and are for Georges Bank zone 'a' only; some elements of the fishery in zone 'b' are also presented for historical purposes.

This Science Response report results from the Science Response Process of April 1, 2015, on the Stock Status Update of Offshore Scallop in Scallop Fishing Areas (SFA) 25-27.

Analysis and Response

The 2014 total allowable catch (TAC) was 5,500 t for zone 'a' and 200 t for zone 'b'. Total reported landings in 2014 were 5,406 t for zone 'a' and 191 t for zone 'b' (Figure 1). Based upon preliminary analysis of the 2014 fishery data and the annual stock survey data, an interim TAC of 4,000 t was set for the 2015 Georges Bank zone 'a' fishery and 200 t for zone 'b'.

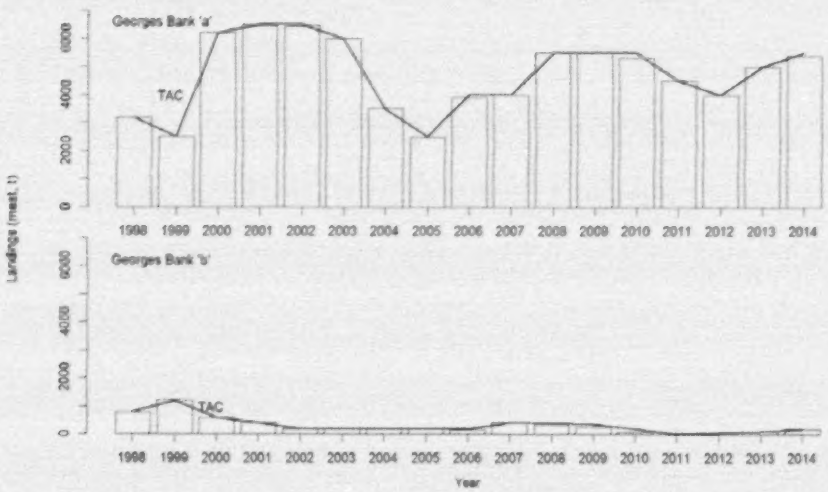

Figure 1. Landings of Scallop meats (metric tons) from Georges Bank 'a' (top panel), and 'b' (lower panel) from 1998 to 2014. Solid line represents total allowable catch (TAC), in metric tons. Prior to 1998, landings from Georges Bank 'a' and 'b' were combined.

Science advice is provided for this stock using a Bayesian state-space assessment model that integrates both fishery and survey data and is described in Hubley et al. (2013). Estimates of fully-

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recruited biomass in 2014 and projections of fully-recruited biomass for 2015 under various catch scenarios are presented and compared to established reference points for this stock.

Fully-recruited biomass, estimated to be 25,760 t in 2014, decreased from the 2013 estimate (34,590 t) and is above the 28-year median biomass of 19,060 t (Figure 2). This decrease in biomass reflects decreases in both survey abundance and weight per tow. Recruit biomass, estimated to be 5,648 t in 2014 increased slightly from the 2013 estimate (5,291 t), and is still above the 28-year median biomass of 3,812 t.

Georges Bank 'a' reference points are based on 30% and 80% of the mean biomass from 1986 to 2009. The Lower Reference Point (LRP) is 7,137 t and the Upper Stock Reference (USR) is 13,284 t. There is a very high probability (>0.99) that the 2014 biomass is currently above the USR and in the healthy zone. The model's forecast for fully-recruited biomass in 2015 is 28,511 t; this projection assumes a catch of 4,000 t (the interim TAC), condition the same as in 2014 (16.9 g/dm^3), and a natural mortality rate of 0.159 (the 3-year mean from 2012-2014). This represents an estimated 10% increase in biomass from 2014 to 2015 (Table 1).

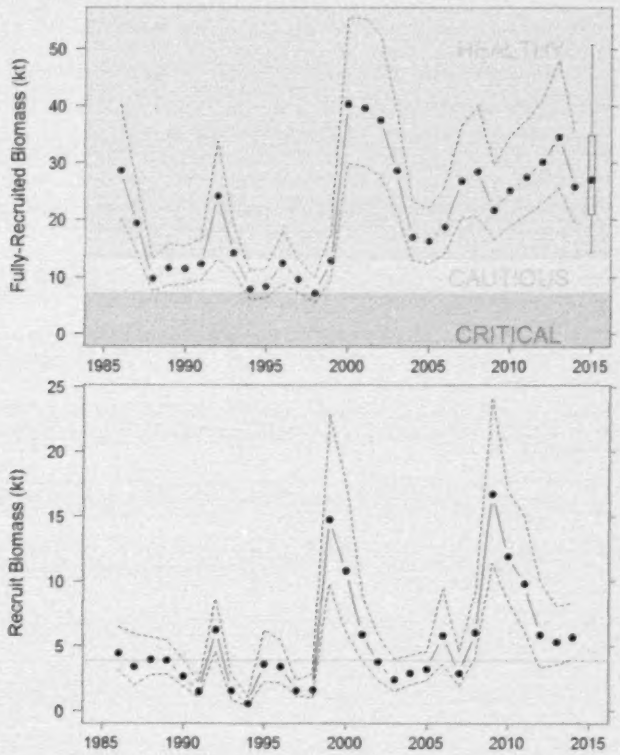

Figure 2. Biomass estimates for fully-recruited (top panel) and recruit (lower panel) Scallops from the stock assessment model fit to the Georges Bank 'a' survey and commercial data. Dashed lines are the upper and lower 95% credible limits on the estimates. Coloured zones (from top to bottom) represent the healthy (green), cautious (yellow) and critical (red) zones (reference points described in text). The horizontal dotted line in the lower panel represents the 28 year median (1986-2013) for recruitment The forecasted fully-recruited biomass for 2015, assuming a catch of 4,000 t, is displayed as a box plot with median (•), 50% credible limits (box) and 80% credible limits (whiskers).

Conclusions

The 2015 interim TAC of 4,000 t results in an exploitation rate of 0.14, and incoming recruitment is expected to be above the median. Catch scenarios ranging from 2,000 t to 6,000 t are predicted to result in increases in fully-recruited biomass with a probability of decline ranging from 0.36 to 0.48 (Table 1). The probability that biomass will remain in the healthy zone was high (>0.91) for all harvest scenarios presented (Table 1).

Table 1. Catch scenarios for Georges Bank 'a' in 2015 in terms of exploitation and expected changes in fully-recruited biomass. Potential catches in 2015 are evaluated in terms of the probability of a decline in biomass and exceeding reference points (Upper Stock Reference (USR) and Lower Reference Point (LRP)). These probabilities account for uncertainty in the biomass forecasts.

Catch (t)	Exploitation Rate	Probability of Biomass Decline	Expected Change in Biomass (%)	Probability biomass will exceed USR	Probability biomass will exceed LRP
2000	0.08	0.36	17.90	0.96	>0.99
2500	0.10	0.37	15.27	0.96	>0.99
3000	0.11	0.38	14.26	0.95	>0.99
3500	0.13	0.40	12.26	0.95	>0.99
4000	0.14	0.42	10.03	0.95	>0.99
4500	0.16	0.43	7.78	0.94	>0.99
5000	0.17	0.44	6.79	0.94	>0.99
5500	0.19	0.47	3.77	0.93	>0.99
6000	0.21	0.48	1.89	0.92	>0.99

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Sources of Information

DFO. 2013. Assessment of Georges Bank Scallops (*Placopecten magellanicus*). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/058.

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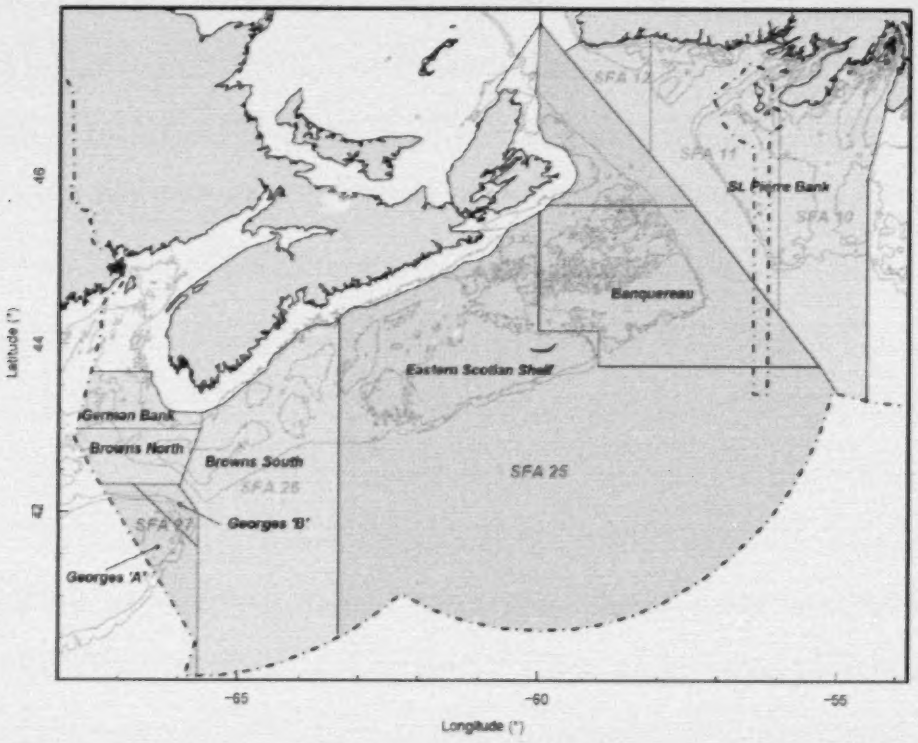
Appendix



Appendix 1. Map showing offshore scallop fishing areas (SFAs) used for management purposes in the Maritimes region. Note the division of Georges Bank 'a' as a subarea of SFA 27.

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